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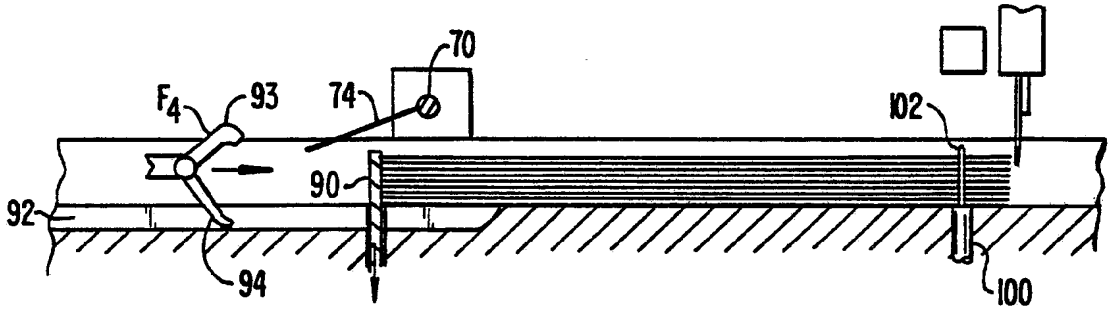

(57) Abstract

A modified bag making machine has retractable stacking pins (102) adjacent the open and fused ends of the bags (64). A bag is advanced under flapper/drivers (74) and is fused to bags immediately below. When the number of bags for a packet (K4) is counted, gripping fingers (93, 94) drag the packet from the stacking area for further operations.

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PROCESS AND APPARATUS FOR MANUFACTURE OF DUAL TAB MERCHANDISING BAG

This invention relates to so-called dual tab merchandising bags. In particular, an apparatus and process for the manufacture of such bags is improved downstream of the so-call bagging machine enabling parallel streams of cut and severed manufactured bags to be stacked, drawn in parallel to a cutting die, simultaneously cut for formation of the handles and tabs.

BACKGROUND OF THE INVENTION

The manufacture of so-called dual tab merchandising bags is known. In order to understand the present invention, the construction of such bags will be first reviewed. Thereafter, the prior art process by which the bags are manufactured will be discussed.

So-called dual tab merchandising bags are known. Such bags include a front panel, and a rear panel, these panels occupying the full dimension and width of the bag. The front and rear panels are joined by folded and "W"-shaped front and rear gusset sides therebetween (hereinafter referred to as "gussets"). The bags are sealed at the bottom and open at the top. Before the bag is opened, the front and rear gussets are folded at a central gusset fold upon themselves and collapsed under and between the bag front and rear panels in a "W" fold.

When the bag is in the collapsed position, the folded gussets only extend partially the width of the front and rear panels of the bag. Thus if the bag in the collapsed position is observed near the side edge, the bag will be found to have four overlying layers. These layers will include: the front panel, the front gusset, the rear gusset, and finally the rear panel. If however, the bag in the collapsed position is observed in the center, the bag will be found to have two

overlying layers. These layers will only be the front and rear panels.

In the dual tab merchandising bag, handle holes are provided centrally of the front and rear panels adjacent the top of the bag. Typically the holes are round, registered over one another, and enable support from the front and rear panels to permit merchandise to be carried in the bag when the bag is grasped and held at the handles.

The so-called "dual tabs" of such merchandising bags are observed when the bag is in the collapsed disposition in a so-called "packet" of bags. These tabs can be found adjacent the sides overlying the bag gussets. The tabs of many bags are fused together to form the packet of bags. The packet of bags is commonly the unitary mass that is manufactured at the same time and taken as a unit to the clerks counter at the same time for serial dispensing -- one at a time.

The tabs at each bag corner usually define a common hole through the center of the tabs from which the bag packet can be mounted and suspended on stanchions. Typically, perforations are used between the body of the bags and the tabs as the separation point between the bag and its associated tabs. When an individual bag is separated from a group of such bags, separation occurs leaving the tabs behind.

Having set forth the conventional construction of such bags, the prior art process of the manufacture of such bags can be discussed.

As is common in the bag making arts, a tube of plastic is formed by "blowing" the tube upwardly into apparatus which holds the tube in a cylindrical upwardly progressing tube. In the example here shown, the upwardly blown tube is a co-extruded tube. This co-extruded tube includes a high coefficient of friction surface on the outside of the tube and a low coefficient of fraction surface on the inside of the tube. As will hereafter be made more clear, the bags manufactured will have the same characteristic. The bags will have a high coefficient of friction surface on the outside of

the bag and a low coefficient of friction surface on the inside of the bag.

At the top of the tube apparatus, the tube is collapsed and thereafter gathered to a cylindrical roll. Such rolls typically accumulate considerable material -- it is not uncommon for a collapsed tube of bag material to form a roll about five feet in width weighing 2000 pounds.

The roll is thereafter placed at the beginning of a so-called "bag machine line" and serially unwound in the manufacture of bags. Typically, the tube of material first passes through a printing station where it is imprinted with the desired bag logo on the exterior of both sides of the tube. Thereafter, the collapsed and printed tube is passed through dryers -- where the ink on the freshly printed bag is dried on both sides.

Thereafter, the collapsed tube passes through so-called slit sealers. These slit sealers both cut and seal the bag longitudinally at the sides. For example, if a tube is to be made into four parallel lines of bags, three slit sealers will cut and seal intermediately of the tube the necessary three additional tubular boundaries. Thus -- and including the two outside boundaries of the tube that were originally present -- what was one sealed tube will now proceed to be four separate side-by-side sealed tubes.

The next step is the placement of so-called "gussets" in the bag sides. Continuing the case of the four sealed tubes, each one of these tubes is flooded with a small amount of air, this air being trapped in each of the moving tubes between upstream and downstream opposed roller pairs. While the respective tubes are temporarily flooded with air, paddles depress each of the tubes inward at their respective sides. As the tubes are collapsed, they remain in the depressed state at the side, forming the characteristic "W-type" folds or gussets at the bags' sides.

Continuing the example, the reader will understand that four endless gusseted tubes proceed in parallel for processing into bags. At this point in the process, because of

the interval of material occupied by the gusseted "W" fold of the bags, the bags as processed will be spaced apart. Further, it will be remembered, that depending upon the width of the bag product desired, the number of tubes may vary. For the purposes of this discussion, the assumption will be made that four tubes of material are being processed. These four tubes then proceed to the so-called "bag making machine."

The bag making machine is immediately preceded by "dancing rollers." These dancing rollers have the function of turning the continuously and constantly advancing side-by-side tubes into intermittently advancing tubes. This intermittent advance is directly related to the length of the bag. Specifically, the dancing rollers intermittently advance a length of bag material sufficient to make one bag as measured from the top of the bag to the bottom of the bag. Once this advance has occurred, the bag machine severs and seals the tubes -- with the severing and sealing occurring substantially simultaneously. Thereafter, the intermittent advance resumes, and the next in order bag is sealed and severed.

The sealed and severed bags are then serially stacked one upon another, this process continuing until a number of bags sufficient to form a bag "packet" is counted out. Typically, these stacks vary in number in accordance with the thickness of the bags, with thinner bags having a high number of fabricated bags in the packet and thicker bags having a lower number of bags in the fabricated packet. For example, the preferred embodiment of the bag here utilized, where the bags are 1 mil thick, stacks of 25 such bags are formed. Once a stack of the requisite number is gathered, the bags as a group are passed to a conveyor for passage to a worker downstream. This worker is commonly referred to as a "packer."

When the worker receives the packet of bags downstream from the bag machine, the first task is to align the bags at their respective edges -- this alignment usually including the top of the bag, the bottom of the bag, and the side edges (adjacent the gusset folds) of the bag. This alignment is required in the normal bag making operation

because the stacking operation is not perfect. As the individual bags are stacked, it is a common occurrence that the bags come out of alignment at all their respective edges.

Once the packet of bags is properly aligned, the respective tab areas of the packet are fused together. This effectively binds and holds the registered bag packets together.

Thereafter, the fused packet is registered to a "clicker press." This machine cuts the bag tops of the packet with a die. In the cutting, the tabs and the handle hole are defined in the top of the bag. This completes the bag manufacturing process.

It is important to note that packets of bags are dispensed from each line at the rate of about 80 to 110 bags per minute depending on length -- smaller bags move faster. This requires that a worker at the end of any of the four discrete lines used in the example above successively align the bags, fuse the bags, and cut the bags at the upper edge at the rate of one packet approximately every 14 seconds. Accordingly, it is the usual case that there is at least one worker at the end of each discrete bag line. In the case of the four bag lines being discussed here, at least four workers are required.

Accordingly, this invention relates to an improvement to the manufacturing process at the so-called "bag making machine."

RELATED PATENT APPLICATION

In a related patent application entitled Self Opening Dual Tab Merchandising Bag, Serial 07/776,920 filed October 15, 1991, my co-inventor Robert Schlender and I disclose an improved tab construction and bag which allows the bag to be serially dispensed to the open position. This bag and tab construction is summarized below and the specification is herein incorporated by reference.

A dual tab merchandising bag is disclosed in the above incorporated patent application which is capable of being

serially dispensed and opened with a single grasping movement of a clerk's arm at the handle opening of the bag front wall. The function of the bag to effect the serial opening can be best understood by first understanding the improved construction of the bag tabs and thereafter reviewing the serial dispensing of the bags from a bundle of commonly manufactured bags and the interaction of the improved tabs in assisting bag opening.

The tabs here utilized are connected to the body of the bag by two so-called projections or "tits." These projections are each formed by paired cuts separating the body of the bag from tabs. The cuts are arcuate and spaced apart one from another at their respective ends. The arcuate cuts form between the tabs and the body of the bag severed borders that point away from the body of the bag and to or toward the material of the tab.

Between the cuts, a small and unsevered section of bag material is allowed to remain. This small unsevered portion of bag material is left in place when the bag is formed, and is the material bridge which joins the body of the bag to the tab until the bag is severed.

Each tab has a border defined from the bag body by three arcuate cuts. The first arcuate cut is from the bag side to the tip of the tab side projection. The second arcuate cut begins the tab side projection and extends to the tab central projection. The third arcuate cut begins at the central arcuate projection and terminates at the bag top. Thus it will be understood that the first and second arcuate cuts, and the second and third arcuate cuts define small areas of unsevered material that form the points of attachment of the tabs to the bag body. Further, the arcuate cuts end at the projections so as to define two upwardly concave borders that almost meet, these upwardly concave borders being disposed towards the material of the tab to define on the material of the bag the "tit" or projection.

When severance of the body of the bag from the tab occurs, the points of the projections or tits tear away at the

tabs. Such tearing propagates the force of severance into the body of the tabs. Propagated "zipper"-like tearing can only occur toward the tabs -- it cannot occur into the body of the bag.

Two projections or tits hold each tab to the body of the bag. One side projection overlies gusset sides of the bag. Thus the side projection formed connects the four layers at the side of the bag to four tab layers. The layers of the bag connected by a side projection includes the front panel, the front gusset, the rear gusset, and finally the rear panel.

A centrally disposed projection overlies the more central portion of the bag. It is placed at a location where it does not conflict with the gusset sides of the bag. Thus this centrally disposed projection connects two layers at the center portion of the bag. The layers of the bag connected by the central gusset projection are the front panel and the rear panel.

The tabs of overlying and similar bags are fused together. They define a common central aperture. This aperture forms the point of suspension of the bags.

It will be understood that the tab on one side of the bag is symmetrical with the tab on the opposite side of the bag. Thus, the description of one tab at one side of the bag, likewise serves to describe the other tab at the other side of the bag. Similarly, and in the description of the tabs interacting with the self opening function of the disclosed bag, the discussion of the operation of one tab at one side of the bag will set forth the symmetrical and simultaneously occurring operation of the tab at the other side of the bag.

Before dispensing occurs, the packet of bags are usually disposed at their upper open end on a flat surface, although this is not required. The flat surface includes two upwardly disposed stanchions. One of these stanchions is threaded through the common aperture of one bag tab of the packet; the other stanchion is threaded through the common aperture of the remaining bag tab of the packet. The

stanchions are spaced apart so that the material of the bags in the packet lies flat between the stanchions.

For optimum dispensing, the bag packet is disposed so that the opening of the bags is to and towards the clerk. This enables grasping of the bag at its open top to occur. The bag is pulled away from the packet of bags outwardly so that the sealed bottom of the bag being dispensed eventually moves over the top of the remaining bags in the bag packet.

In grasping of the bag to be dispensed, the clerk grabs the front panel above the upwardly exposed handle aperture in the front of the bag. The reader will remember that such grabbing will occur at the exterior of the bag surface having the high coefficient of friction. Thus the clerk will be assisted by the outwardly exposed high coefficient of friction of the exterior of the bag surface. Singulation of the bag being grasped easily occurs.

At this point, the front bag panel will begin to be pulled forward. In such a pulling motion, the front panel of the bag being dispensed will slide forward and over the rear panel of the bag being dispensed. Moreover, as the low coefficient of friction layer of material on the inside front panel of the bag is exposed to the low coefficient of friction material of either the gussets or rear panel of the bag, the sliding of the front panel over the rear panel and gussets will be assisted by the relative low coefficients of friction of the inside surfaces of the bag.

Once this relative sliding motion begins, the central projection connecting the front panel to the bag tab will come under tension. When the tension is sufficient, the central projection will tear. Severing of the central projection will occur.

Successive tearing of each of the projections will follow. The order of tearing from the tabs will be:

1. Central projection at the front panel;
2. Side projection at the front panel;
3. Side projection at the front gusset;
4. Side projection at the rear gusset;

5. Side projection at the rear panel; and,

6. Central projection at the rear panel.

The term "successive" is emphasized. The projections tear -- one at a time at each tab. Further as the projections serially tear, they dynamically interact to dispose the bag to the open position. Specifically, the projections tear in sequence about the circumference.

Considering one bag side and one tab only, and remembering that the other bag side and tab act precisely symmetrically, the tearing -- and opening -- sequence can now be understood. It is sufficient to inform the reader that as tearing of an actual bag from a packet of bags occurs, the sequential parting of the projections can be tactilely perceived and counted. In other words, there is no question that serial severance from the suspending tabs occurs with each projection being serially severed in its turn.

At first the front panel slides out of registry with the gussets and rear panel. Thereafter, the inside projection connecting the front panel to the tab tears. This is followed by the tearing of the outside projection to the tab.

At this point, the front panel of the bag grasped by the clerk is well out ahead of the rear panel, which rear panel remains registered to the remaining bags of the bag packet.

Serially tearing of the projections continues at the outside projections with the projection at the front gusset tearing followed by the projection at the rear gusset and then tearing of the outside gusset at the rear panel.

At this point, it will be noted that the gusset panels and the rear panels are out of registry with the panels of the underlying bag packet. The only portion remaining in registry with the bag packet is the rear panel adjacent the inside gusset. Stated in other terms, the entire bag is being moved away from the rear panel adjacent the open end of the bag. The bag is thus being opened by the natural dispensing action.

Finally, the rear panel at the inside projections are severed. When this occurs, the bag is held by the clerk at the

front panel with the rear panel depending downward in a natural open disposition.

Observing the open bag is instructive. The open end or "mouth" of the bag remains in an oval open position relative to the otherwise flat plane of the rest of the bag; the forces of elastic memory or electrostatic forces do not close the bag. Further, the front panel, front gusset, rear gusset, and rear panels are all folded at different angles one to another. This folding provides "origami" like folds to the bag which tend to provide a strong force holding the bag in the open position. As a consequence, merchandise can easily be registered to the elongate, open end of the bag for filling the bag with purchased items for customer transport out of the store.

Two observations relative to the bag filled with merchandise can be made. First, because the high coefficient of friction polymer is shiny, the exterior of the bag sparkles or is highly reflective imparting to the bag an aesthetic sheen. Secondly, since it is not required that the bag side be scalloped to avoid the propagation of tears, the bag sides do not drape over the merchandise hence, covering over the imprinted logo. Simply stated, the filled bag presents an advertising display of store logo of the best possible variety.

SUMMARY OF THE INVENTION

A bag making machine is modified at the discharge side to include upwardly protruding stacking pins at the stacking area of the severed bags adjacent the open and fused ends of the bag. The sealed and severed bags are impressed downward over the stacking pins after severing to immediately impale just made bags at their upstream, open, and trailing end so that severed bags are aligned at their open end in precise registry one stacked on another.

Preferably, and at the time each individual bag is stacked, the bag is fused in the gusset area at the upper open corners of the bag to bags immediately below. This fusing continues with each stacked individual bag until the total number of bags required for the bag packet is counted.

When the correct number of bags for the bag packet is counted, stacked and fused at the end of each serial stream of bags, spaced apart paired gripping fingers grasp the bag packet at the sealed and stacked bottom ends of the bags constituting the packet. At substantially the same time, the respective locator or stacking pins retract from the stacking area at the fused open end of the stacked bag packet, and the bag packet is free to move.

The gripper fingers for all of the common bag lines are commonly mounted to a gripper finger bar. This gripper finger bar extends across the width of the four bag packets and moves parallel to the direction of bag packet conveyance. Thus, when the gripper fingers close on the bag packets in the area of the sealed bag bottoms and the bar moves, the bags are dragged from the stacking area by the bottom sealed portion with the top open portion being the trailing part of the dragged mass.

Movement of the bag packets from each of the parallel streams of bags occurs in parallel. The gripper fingers, grasping the fused bag packets at the bottom, simultaneous move the bags down stream to a universal cutting table. Each bag packet is grasped by two such fingers so that the fused open ends follow in precise alignment from their point of stacking on and impalement to the stacking pins. These aligned and parallel bags are thereafter dragged and stopped at their open end under a cutting die mounted on the universal cutting table.

The cutting die is configured to cut each of the registered open and fused ends of the bag packets. One portion of the cut defines in each bag packet the required handle hole in the front and rear panels of the stacked bags. The other portion of the cut defines in each bag packet the required cuts around the fused portion of the bag to define the bag tabs. It will be understood that the bag tab of the bag construction incorporated by reference is preferred. Each bag packet from each serial stream is cut simultaneously.

Once cutting has occurred, the gripper fingers continue rearward, further dragging the bag packet. Final deposit of the bag packet occurs to an underlying conveyor.

The bag packets are thereafter deposited on the conveyor and conveyed to product inspectors.

DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic of a bag line from a cylindrically wound and collapsed tube to the entrance to a bag machine, this much of the supplied view schematically illustrating the prior art;

Fig. 2 is a perspective taken at the bag machine illustrating the machine from a point of view down stream of the bag knife and bottom sealing apparatus, showing bags previously stacked and fused at the stacking area impaled on the stacking pins with the bag stock being fed through the bag knife/bottom sealing apparatus for stacking of the next sequential bag, the view here illustrating the four side-by-side packs;

Fig. 3A - 3D are a side elevation section of the bag packets showing in cartoon series:

Fig. 3A illustrating the next in order bag being advanced;

Fig. 3B illustrates the same next in order bag of Fig. 3A being impaled and fused to the bag packet;

Fig. 3C illustrates the complete bag packet with the preferred 25 bags have been accumulated with the bottom of each bag packet disposed for grasping by gripper fingers and stacking pins being retracted from the top end of the bag so that the stacked, fused and aligned top end of the bag is free to move;

Fig. 3D illustrates the complete bag packet being pulled away by the gripper fingers from the stacking area with the sealed bottom ends of the bags of the bag packet being dragged first and the trailing open ends of the bags of the bag packet following;

Fig. 4 is a perspective view of the parallel stream of bags registered to the cutting die on the universal cutting table with the cutting die about to perform the tab and handle forming cuts on all bag packets simultaneously; and,

Fig. 5 is a perspective view of the parallel stream of bags pulled away from the cutting dies at the universal cutting table with the gripper fingers releasing the completed bag packets to an underlying conveyor for transport to inspection and packing stations.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, a schematic of bag production is offered for the understanding of the viewer. Blown film extruder B extrudes at least plastic bag material having a relatively high exterior coefficient of friction and a relatively low interior coefficient of friction in cylindrical chimney C. At the top of chimney C, extruded plastic film P is collapsed, passes through driving roller pairs 14, 16, and 18 with the material being accumulated to cylindrically wound roll 20. Roll 20 can be quite large -- in the order of five feet wide and 2,000 pounds. It is typically transferred to and unwound at the beginning of a bag line as partially illustrated at the remaining portions of Fig. 1.

Roll 20′ unwinds through printers R_1 and R_2 and passes the freshly printed bag stock through dryers D_1 and D_2. Thereafter, the material is routed via rollers 26, 28, 30, 32 to three slit/sealers L_1, L_2, and L_3. It is the function of these respective slit/sealers L_1, L_2, and L_3 to cut a seam in the advancing plastic tube and at the same time to seal the seam in the passing plastic tubes. Therefore, the reader will understand that where one tube P had existed before slit/sealers L_1, L_2, and L_3, after the slit/sealer four continuously conveyed plastic tubes P_1, P_2, P_3, and P_4 will exist. As the slit/sealers L_1, L_2, and L_3 do not use appreciable material from the passing plastic tube material, the respective continuously conveyed plastic tubes P_1, P_2, P_3, and P_4 will be adjacent one to another.

After the continuously conveyed plastic tubes P_1, P_2, P_3, and P_4 pass above the respective slit/sealers L_1, L_2, and L_3 and roller pair 50 and 52, they are inflated with constantly displaced bubbles of air. One bubble of air is in each of the continuously conveyed plastic tubes P_1, P_2, P_3, and P_4. These bubbles of air temporarily inflate the respective tubes in a standing mode during the passing of the tube material. Just before collapse of the respective tubes at roller pairs 54, side paddles 41 - 48 move in and compress the side of each of the continuously conveyed plastic tubes P_1, P_2, P_3, and P_4. This operation imparts the continuous gusset folds at the respective sides of the ultimately formed bags.

It will further be understood that once the respective continuously conveyed plastic tubes P_1, P_2, P_3, and P_4 have passed paddles 41 - 48, the continuously conveyed plastic tubes will be spaced apart one from another by approximately the amount of material occupied by the gusset fold. This being the case, this spacing will remain between the rest of the bag processing illustrated in the disclosure herein.

Continuously conveyed plastic tubes P_1, P_2, P_3, and P_4 will thereafter pass through respective roller pairs 50, 52, and 54 to so-called "dancing rollers" 56, 57 and 58. These respective rollers turn the continuously conveyed plastic tubes P_1, P_2, P_3, and P_4 into intermittently conveyed plastic tubes P_1, P_2, P_3, and P_4. As schematic representation of such roller function only is offered as such rollers are well known. It can be seen that if roller pair 57 reciprocated upwardly and downward and roller pair 58 intermittently advance, the continuous advance through roller pair 56 is buffered by the motion of roller pair 57 enabling drive rollers 58 to intermittently advance conveyed plastic tubes P_1, P_2, P_3, and P_4.

Referring to Fig. 2, drive rollers 58 are shown intermittently advancing conveyed plastic tubes P_1, P_2, P_3, and P_4. Such intermittent advance occurs under control of optical heads O_1, O_2, O_3 and O_4. The respective intermittently conveyed plastic tubes P_1, P_2, P_3, and P_4 are passed in controlled lengths under sealing and severing assembly 80. In the view shown in

Fig. 2, partial packets of bags K_1, K_2, K_3, and K_4 are being assembled against a barrier 90 (only partially shown in Fig. 2). Respective bags 61 - 64 are shown being advanced under rotation flapper/drivers 71 - 74 to add another bag to the respective partial packet of bags K_1, K_2, K_3, and K_4. This addition occurs at each partial packets of bags K_1, K_2, K_3, and K_4. Such sealing and severing occurs at knife assembly 80 and can more fully be understood with respect to the cartoon series of Figs. 3A - 3D.

Referring to Fig. 3A, bag 64 is being intermittently advanced. Such an intermittent advance occurs until the end of bag 64 registers adjacent to wall 90 and roller 58 stops driving bags 61 - 64 responsive to the optical head O. It will be observed in the view of Fig. 3A, that knife assembly K is retracted upwardly so that bag 64 (and remaining bags 61 - 63) pass under the assembly K.

When the full length of bag 64 has been conveyed under knife assembly K, the knife assembly severs, seals and impales the bag 64 on pins 102 and finally fuses the bags 64 at the area to the respective tabs that will ultimately be formed. Explanation for each function will be separately offered.

First, severing occurs at knife 92. This knife 92 cuts the open top of bag 64 free of the intermittently advancing strip P_4.

Secondly, at and at substantially the same time severing occurs, sealing of the bottom of the next in order bag to be fabricated occurs. Specifically, sealing bar 94 descends and fuses the bag front wall, rear wall and gussets into a single unitary bag bottom. This bag bottom will eventually be registered adjacent to wall 90 when the next in order bag 64 is advanced. Preferably, no part of bag 64 actually contacts wall 90; instead, movement of bag 64 ceases short of the wall.

Impaling of bag 64 on pin 102 occurs. Simply stated, pin 102 is a retractable pin mounted in a bore 100. Normally pin 102 is in the up position. A bar 96 registers down and over pin 102 as each bag is stacked. Such pin registry occurs at the outside upper corners of bag 64 where the so-called dual

tab of the bag will be ultimately made. Further, pins can be intermittently place across the opening of the bag.

Finally, fusing of each bag 64 in the area of the future tab occurs. Fusing plugs 98 are here shown supplied to bar 96. As each bag is separately stacked, fusing plug 98 fuses the bag in the vicinity of the future tabs. Thus, the bag packets -- as they are formed -- are fused in immediate alignment immediately after they are deposited on their respective packet K.

Stopping here, a word may be mentioned about the alignment at this juncture. It is critical that the open tops of bags 64 be correctly aligned. This is required so that bag packets K_1, K_2, K_3, and K_4 can be simultaneously moved together and cut at their registered upper and open ends. While some misalignment may occur at the bag bottoms, the reader will understand that correct registry of the bag packets at the open top of the bags is critical.

Further, it will be remembered that the bag bottoms adjacent stop 90 are sealed. Anyone familiar with dual tab merchandising bags can observe that this seal forms an expanded area on the bottom of the bag. When a group of twenty five bags are all stacked one upon another with this bottom sealed area of each bag register, an ideal expanded packet area is formed. It is this expanded area which is grasped by fingers F to effect dragging of the completed bag packet K away from its stacking area for cutting of the handle and bag tabs.

Referring sequentially to Figs. 3C and 3D, the remainder of the cartoon series can easily be understood. Finger assembly F_4, has respective fingers 93, 94 in the open position. Fingers 94 advance in a trough 92 so that grasping of packet K_4 can occur under the packet at the respective registered bag bottoms.

Referring to Fig 3D, it will be seen that stop 90 and pins 102 have been retracted. Finger assembly F_4 then moves away from knife assembly K taking packet K_4 with the finger assembly and dragging the top portion of the bags in a trailing pattern.

The remainder of the process is simply understood in the views of Figs. 4 and 5.

Referring to the view of Fig. 4, pulling by the respective finger assemblies F_1, F_2, F_3 and F_4 occurs until the respective tops of bag packets K_1, K_2, K_3, and K_4 are registered under cutting knife 110. Knife 110 then comes down on the respective packets K_1, K_2, K_3, and K_4 and causes handles H and tabs T to be formed in each of the respective bag packets at the open registered top ends. Thereafter, and as illustrated in Fig. 5, further pulling of the bags to conveyor 120 occurs with the bag packets then passing to inspection.

It will be understood that the illustrated process enables the bags to be automatically processed in parallel streams. Considerable labor is saved. Further, a high quality bag product results.

WHAT IS CLAIMED IS:

1. In a bag machine apparatus for the manufacture of a dual tab merchandise bag including in combination:

means for advancing a plurality of lines of gusseted bag stock in successive and intermittent intervals over at least a first bag stacking area at the end of said first line and a second bag stacking area at the end of said second line, each said successive and intermittent interval being the length of said bags from the opening of said bag to the bottom of said bag;

means for successively sealing and severing said bag stock to dispose said bag stock at each bag stacking area with said sealed end of each said bag away from said sealing and severing apparatus and said open end disposed to and toward said sealing apparatus;

means for counting said sealed and severed bags to determine a predetermined count of said bags for the formation of a packet of said bags;

the improvement to said bag machine comprising in combination:

a plurality of upwardly protruding stacking pins at the discharge side of said sealing and severing apparatus at said first and second stacking areas of said severed bags adjacent the open and fused ends of the bag;

means for impaling said bags to said stacking upon sealing and severing whereby sealed and severed bags are maintained at said open end in alignment by said pins;

means for inserting and removing said stacking pins from said first and second stacking areas operatively connected to said stacking pins for inserting said stacking pins when said bags are impaled on said pins and stacked in said stacking area and removing said pins when said bags are counted to a packet of said bags and removed from said stacking area;

means for fusing said sealed and severed bags at the corners thereof in a tab area of said bags to fuse together a packet of said bags;

means for gripping and pulling said bags as stacked and counted to move said bags from said stacking area to a cutting area;

means for cutting at said cutting area at the top of each said bag packet for forming to said packet tabs and handles for all said bags in said bag packet.

2. The invention of claim 1 and including four lines of advancing bag stock and four stacking areas.

3. The invention of claim 1 and wherein said means from gripping includes:

a plurality of gripper fingers for each said bag packet;

a bar mounting each of said gripper fingers spanning across said bag stacking areas;

means for opening and closing said gripper fingers for respective releasing and grasping said bags; and,

means for moving said bar away from said grasped bags through said cutting means to dispose said open ends of said bags to said cutting means for cutting said tabs and said handle apertures.

4. The invention of claim 3 and including:

a conveyor at said cutting means for receiving said bag packets after cutting of said tabs and said handles at said cutting means.

5. In a process for the manufacture of a dual tab merchandise bag including the steps of:

advancing a plurality of lines of gusseted bag stock in successive and intermittent intervals over at least a first bag stacking area at the end of said first line and a second bag stacking area at the end of said second line, each said successive and intermittent interval being the length of said bags from the opening of said bag to the bottom of said bag;

successively sealing and severing said bag stock to dispose said bag stock at each bag stacking area with said sealed end of each said bag away from said sealing and severing apparatus and said open end disposed to and toward said sealing apparatus;

counting said sealed and severed bags to determine a predetermined count of said bags for the formation of a packet of said bags;

the improvement to said process comprising the steps of:

providing a plurality of upwardly protruding stacking pins at the discharge side of said sealing and severing apparatus at said first and second stacking areas of said severed bags adjacent the open and fused ends of the bag;

impaling said bags to said stacking upon sealing and severing whereby sealed and severed bags are maintained at said open end in alignment by said pins;

inserting and removing said stacking pins from said first and second stacking areas operatively connected to said stacking pins for inserting said stacking pins when said bags are impaled on said pins and stacked in said stacking area and removing said pins when said bags are counted to a packet of said bags and removed from said stacking area;

fusing said sealed and severed bags at the corners thereof in a tab area of said bags to fuse together a packet of said bags;

gripping and pulling said bags as stacked and counted to move said bags from said stacking area to a cutting area;

cutting at said cutting area at the top of each said bag packet for forming to said packet tabs.

6. The process of claim 5 and wherein said cutting step includes cutting handles for all said bags in said bag packet.

7. The process of claim 5 and wherein said fusing step includes:

fusing each said bag as said bags are stacked and impaled on said pins.

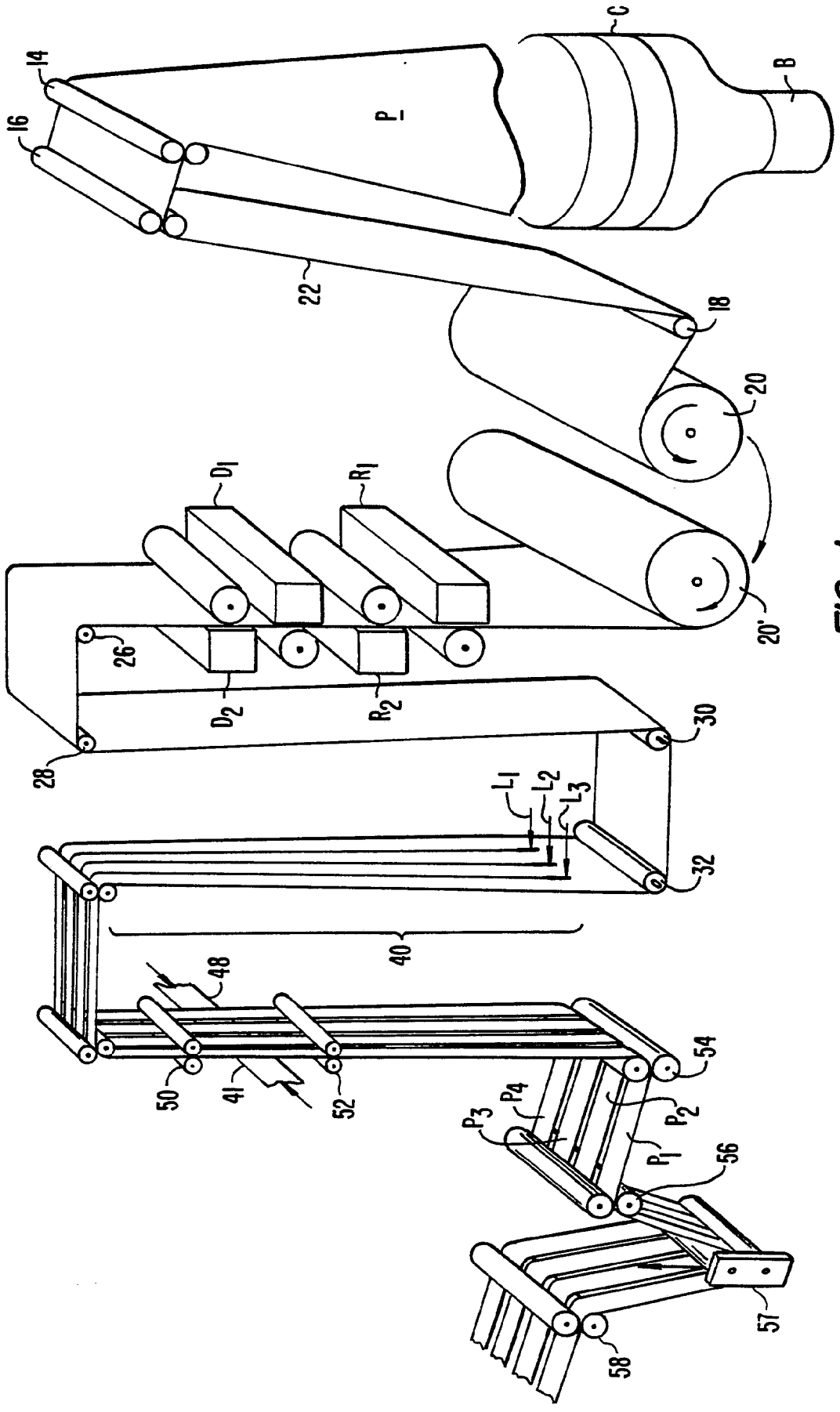

FIG. 1. PRIOR ART

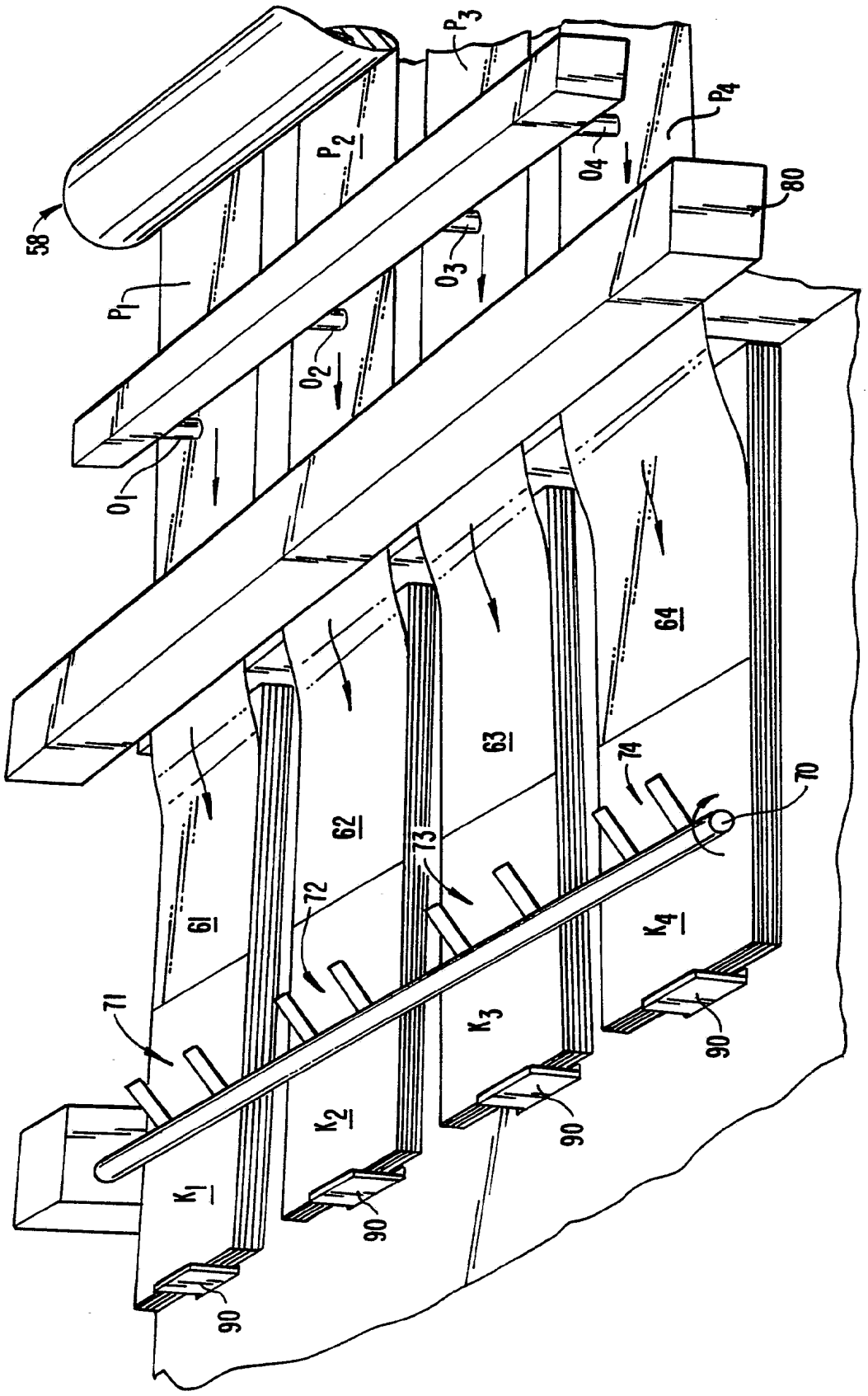

FIG. 2.

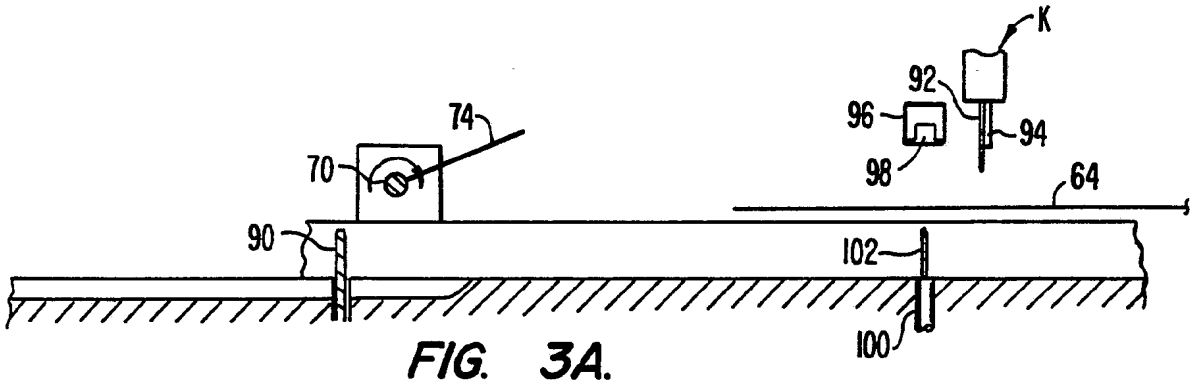

FIG. 3A.

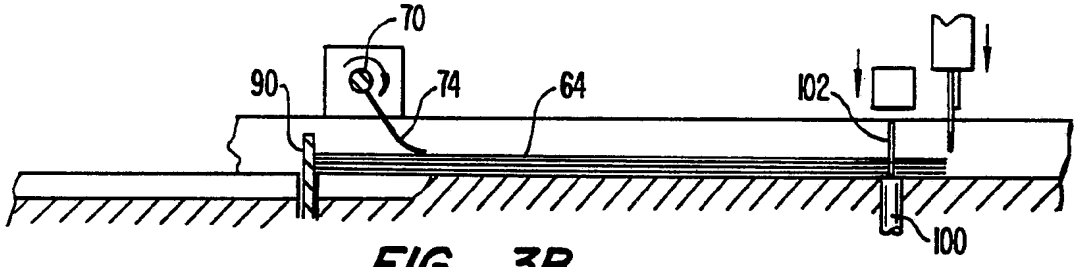

FIG. 3B.

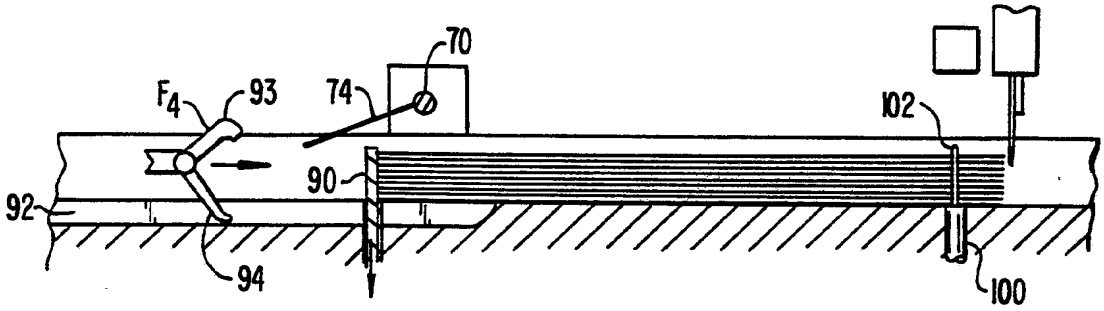

FIG. 3C.

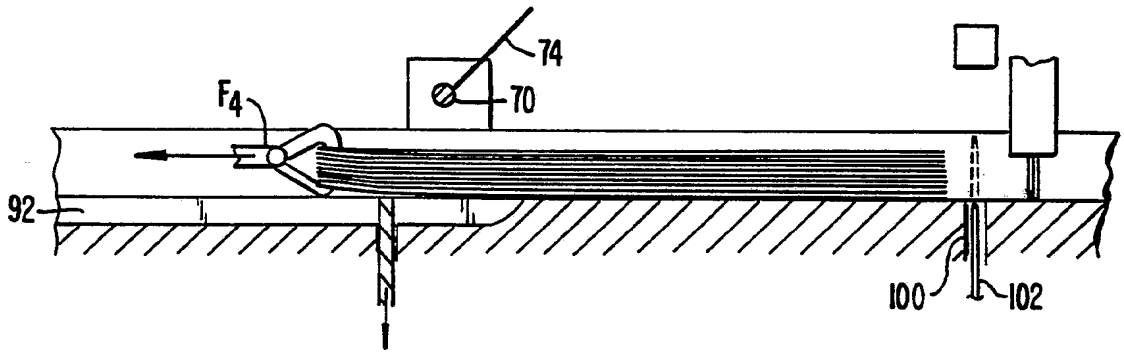

FIG. 3D.

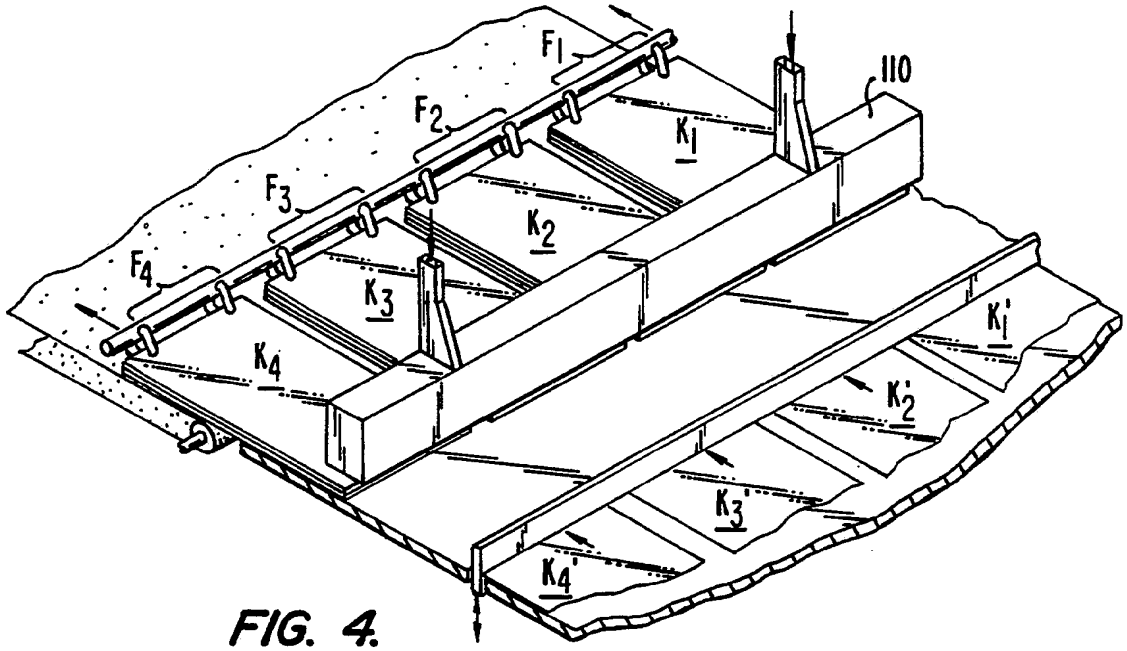
F1
F2
F3
F4
K1
K2
K3
K4
110
K1'
K2'
K3'
K4'

FIG. 4.

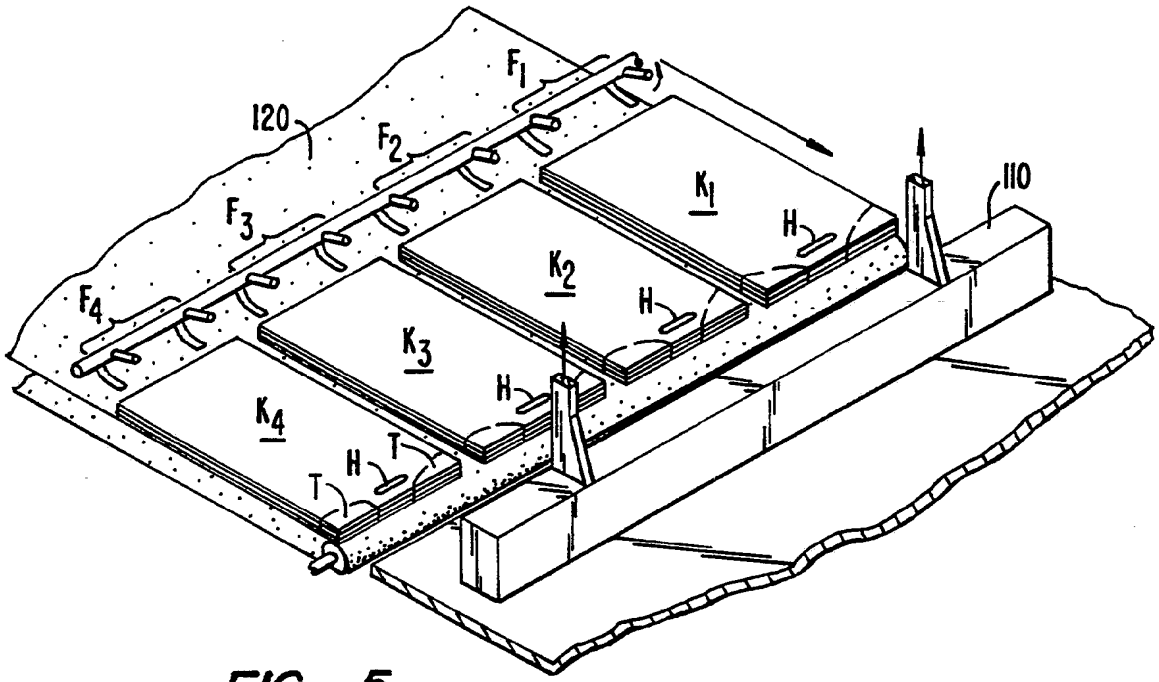
F1
120
F2
F3
F4
K1
K2
K3
K4
H
T
110

FIG. 5.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US92/02920

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :B31B 23/98, 23/86
US CL :493/194,195,196,204
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 493/194,195,196,204 493/198,209

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A 4,181,069 (Porter) 01 January 1980	
A	US,A 4,195,960 (Schulze) 01 April 1980	
A	US,A 4,342,564 (Lehmacher) 03 August 1982	
A	US,A 4,512,757 (Dreckmann) 23 April 1985	
A	US,A 4,516,895 (Hall) 14 May 1985	
A	US,A 4,526,565 (Hummel et al) 02 July 1985	
A	US,A 4,699,607 (Lambrecht) 13 October 1987	
A	US,A 4,790,803 (Roen et al) 13 December 1988	
A	US,A 4,995,860 (Wilfong) 26 February 1991	
A	US,A 5,030,191 (Reifenhauser) 09 July 1991	

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 08 AUGUST 1992	Date of mailing of the international search report 06NOV 1992
Name and mailing address of the ISA/ Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. NOT APPLICABLE	Authorized officer WILLIAM E. TERRELL Telephone No. (703) 308-2174

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